2004 GALVESTON BAY INVASIVE SPECIES RISK ASSESSMENT
INVASIVE SPECIES SUMMARY
Created by: Environmental Institute of Houston, University of Houston-Clear Lake
and the Houston Advanced Research Center

Common Name: Asian ambrosia beetle
Latin Name: ***Xylosandrus crassiusculus*** (Syn *Phloeotrogus crassiusculus* Motschulsky, *Xyleborus crassiusculus* (Motschulsky), *Xyleborus semiopacus* Eichhoff , *Xyleborus semigranosus* Blandford, *Dryocoetes bengalensis* Stebbing, *Xyleborus mascarenus* Hagedorn, *Xyleborus okoumeensis* Schedl, *Xyleborus declivigranulatus* Schedl)
Category: Terrestrial Animal
Place of Origin: Tropical and subtropical Asia http://creatures.ifas.ufl.edu/trees/asian_ambrosia_beetle.htm
Place of Introduction: Charleston, South Carolina. "It apparently has spread along the lower Piedmont region and coastal plain to North Carolina, Louisiana, Florida (Chapin and Oliver 1986, Deyrup and Atkinson 1987), and East Texas (Atkinson, unpublished). It was collected in western Florida in 1983 (Chapin and Oliver 1986), in southern Florida in 1985 (Deyrup and Atkinson 1987), and now is distributed throughout the state. In the Gainesville, Florida area it is abundant in urban, agricultural, and forested areas (http://creatures.ifas.ufl.edu/trees/asian_ambrosia_beetle.htm)."
Date of Introduction: 1974
Life History: "Females bore into twigs, branches, or small trunks of susceptible woody plants, excavate a system of tunnels in the wood or pith, introduce the symbiotic ambrosial fungus, and produce a brood. Like other ambrosia beetles, they feed on ectosymbiotic fungi which they introduce into their tunnels and cultivate and not the wood and pith of their hosts. Eggs, larvae, and pupae are found together in the tunnel system excavated by the female. There are no individual egg niches, larval tunnels, or pupal chambers. It breeds in host material from 2 to 30 cm in diameter, although small branches and stems are most commonly attacked. Attacks may occur on apparently healthy, stressed, or freshly cut host material. High humidity is required for successful reproduction. Attacks on living plants usually are near ground level on saplings or at bark wounds on larger trees (Browne 1961, Schedl 1962). Females remain with their brood until maturity. Males are rare, reduced in size, flightless, and presumably haploid. Females mate with their brother(s) before emerging to attack a new host (http://creatures.ifas.ufl.edu/trees/asian_ambrosia_beetle.htm)."
Growth/Size: Females are 2.1-2.9 mm long, males are 1.5 mm long
Feeding Habits/Diet: "*X. crassiusculus* is capable of breeding in a wide variety of hosts. Known hosts in the U.S. include peach, plum, cherry, persimmon, golden rain tree, sweetgum, Shumard oak, Chinese elm, sweet potato, and magnolia. Bradford pear and pecan as hosts commonly attacked in Florida and in the Southeast. Schedl (1962) listed 124 hosts, mostly tropical, in 46 families including coffee, cacao, mango, papaya, Australian pine, rubber, camphor, mahogany, tea, and teak. In May, 2000 a nursery grower submitted samples of crape myrtle infested with this beetle. This popular ornamental plant is already known as a host for *X. crassiusculus* (http://creatures.ifas.ufl.edu/trees/asian_ambrosia_beetle.htm)."
Attitude (aggressive, etc.): "Large numbers of attacks were found in Shumard oaks along the lower 1 m of stem in 3 m saplings with no other symptoms of disease, attack by other insects, or visible stress. Female beetles were boring into green, fresh, unstained portions of the stems. Visible symptoms included wilted foliage and strings of boring dust from numerous small holes. The large numbers of attacks apparently resulted in the death of the trees. Large Drake elm saplings showed isolated attacks on the lower stems which did not directly kill plants. Subsequently, large cankers formed at the site of attacks, in some instances, resulting in the death of trees by girdling. This type of damage is similar to that reported by Browne (1961) and Schedl (1962). Kovach and Gorsuch (1985) reported attacks on branches of apparently healthy young peach trees in coastal South Carolina (http://creatures.ifas.ufl.edu/trees/asian_ambrosia_beetle.htm)."
Physical Description: "Like other species of the tribe Xyleborini, the head of *X. crassiusculus* is completely hidden by the pronotum in dorsal view, the antennal club appears obliquely cut, and the body is generally smooth and shining. *Xylosandrus* spp. are distinguished from related genera (*Xyleborus, Xyleborinus, Ambrosiodmus*) by the stout body, truncate elytral declivity, and non-contiguous procoxae. Female *X. crassiusculus* are 2.1-2.9 mm long, stout bodied; the mature color is dark reddish brown, darker on the elytral declivity. Males are much smaller and differently shaped than females , being only 1.5 mm long with a radically reduced thorax and a generally "hunch-backed" appearance. Males are flightless, like those of other xyleborines. *X. crassiusculus* is distinguished from related species in the southeastern United States by its large size (females of other species are 1.3-2.0 mm long), and the dull, densely granulate surface of the declivity (smooth and shining in other species). Larvae are white, legless, "C" shaped, and have a well developed head capsule. They are not distinguishable in any simple way from those of other Scolytidae or most

Curculionidae (http://creatures.ifas.ufl.edu/trees/asian_ambrosia_beetle.htm)."

Management Recommendations / Control Strategies: include references for existing site-specific strategies

"Pyrethroids have been found to provide control of attacking adults if applied prior to the closing of the galleries with frass. Once the beetles are in the tree and have frass packed in the entry holes they are isolated from the outside. If infestations occur, affected plants should be removed and burned and trunks of remaining plants should be treated with an insecticide labeled for this pest or site and kept under observation. Any obvious conditions causing stress to trees should be corrected (http://creatures.ifas.ufl.edu/trees/asian_ambrosia_beetle.htm)."

"Managing Wood-boring Insects

Prevention

Since most wood-boring insects are considered secondary invaders, the first line of defense against infestation is to keep plants healthy. Proper care of trees and shrubs discourages many borer pests and helps infested plants survive. Good sap f low from healthy, vigorously growing trees, for example, defends the plant from damage by many borer pests. Good horticultural practices include:

- Selecting well adapted species of trees and shrubs that are not commonly attacked by wood borers in your area. Arizona ash, birch, cottonwood, locust, soft maple, f lowering stone fruits (such as peaches and plums), slash pines (in west Texas), willow and poplar are especially prone to borer attack.
- Choosing and preparing a good planting site to avoid plant stress, freeze damage, sun scald and wind burn.
- Minimizing plant stress and stimulating growth by using proper watering and fertilization practices.
- Avoiding injury to tree trunks from lawn mowers, weed trimmers or construction.
- Promptly caring for wounded or broken plant parts using pruning or wound paint during all but the coldest months of the year.
- Properly thinning and pruning during colder months.
- Removing and destroying infested, dying or dead plants or plant parts, including fallen limbs.
- Wrapping tree trunks and limbs with quarter-inch hardware cloth spaced about 1 1/2 inches from the tree's surface where woodpecker damage is likely.

(See Extension publications L-1309, "Protecting Existing Landscape Trees from Construction Damage Due to Grade Changes," and L-1097, "Fertilizing Woody Ornamentals," for additional information.)

Wrapping trunks to prevent borer attack is ineffective and may, under certain conditions, increase the rate of infestation. Using plastic trunk protectors to help prevent injury from lawn mowers and weed trimmers is a good idea.

Non-chemical control for infested plants

Once trees and shrubs are infested, non chemical options for borer control are limited. One option is to remove and destroy heavily infested or injured plants. Damage sites also can be inspected closely to determine if the larvae stages can be extracted from the plant with a pocket knife, wire or other suitable tool.

Chemical control

It is important to remember that stressed, unhealthy trees can be attacked repeatedly and will need repeated applications of insecticide indefinitely. In most cases this is neither economical nor environmentally justified. When chemical treatments are used, efforts always should be made to improve overall tree health.

Insecticide products registered for borer control are listed in Table 1. Most of these products are applied as sprays to the trunks and branches, and are non-systemic, **residual insecticides** (e.g., bendiocarb, carbaryl, chlorpyrifos, endosulfan, es-fenvalerate, fluvalinate, lin-dane, methoxychlor, sumithion). While these products do not kill larvae that have already penetrated the sap-wood or heartwood, they will kill adult and larval stages tunneling through the treated bark layer. These are primarily a preventive treatment. Some products (those containing paradichlorobenzene and ethylene dichloride) act as **fumigants** to repel egg-laying adults or kill accessible larvae.

Systemic insecticides are ineffective for borer control and few are registered for this purpose.

Trunk injection products (containing acephate, dicrotophos and oxydemeton-methyl) are registered for treatment of some borers. These products are supposed to work by delivering insecticides into the cambium and phloem tissues where borers feed. These injections are most effective against sap feeding insects and rarely affect wood borer larvae. Furthermore, research has shown that damage caused by inserting the injection devices into trunks can be significant. Data supporting the effective use of these products has not been produced in Texas.

Several factors should be considered when using insecticides to control insect borers:

1. **Time your treatments to match adult activity.** The life cycles of some insect borers are well known in Texas. Knowing when adults lay their eggs is critical, as insecticides are most effective if applied when adults are emerging and eggs are hatching. For the peachtree borer, a single surface application of a contact insecticide in late August or early September can prevent infestations on *Prunus* species. For most beetles, the adult egg-laying period is either very long or unknown. Surface treatments are effective for only a 3- to 10-week period. Therefore, regular re-treatment of susceptible plant parts is needed for effective control.

2. **Be sure coverage is complete and minimize drift.** Effective treatment for borers requires that all surfaces of trunks and branches be covered (see Fig. 9). Only in a few instances (such as for peachtree borer) is treatment of only the base of the tree trunk sufficient to protect the tree. Complete coverage may be difficult on large trees and may result in drift to non-target areas. To minimize drift, spray only on days when wind is less than 6 to 7 miles per hour. When making applications, *always wear proper protective clothing* (long-sleeved shirt, hat and eye protection as described on the product label) to avoid contact with the pesticide.
3. **Treat susceptible plants.** Treatment of highly-valued landscape trees or vulnerable plants may be justified. Newly transplanted trees and shrubs are naturally stressed and may need treatment, especially when borers are known to attack newly planted trees in the area.

Firewood

Adult wood borers sometimes emerge from firewood stored indoors. While most of these insects are not considered harmful, old house borer and powderpost beetles will attack seasoned, dry wood inside the home (see Extension publication L-1784, "Wood Destroying Beetles"). Treating firewood with insecticide is both ineffective and potentially dangerous to the homeowner. Wood should be stored outdoors away from the house until just before use. If firewood is infested with borers it can be treated by wrapping it in a tarp and allowing sunlight to heat it. Stacking wood layers in alternate directions will help it dry and reduce areas that can harbor insects (http://insects.tamu.edu/extension/bulletins/b-5086.html."

References (includes journals, agency/university reports, and internet links):

1. http://creatures.ifas.ufl.edu/trees/asian_ambrosia_beetle.htm. Featured Creatures, University of Florida Department of Entomology and Nematology, and Florida Department of Agriculture and Consumer Services, Division of Plant Industry

2. http://insects.tamu.edu/extension/bulletins/b-5086.html. Drees; Bastiaan M.; John A. Jackman; Michael E. Merchant. Wood boring insects of trees and shrubs. The Texas A&M University System. B-5086.

3. Chapin, J.B., and A.D. Oliver. 1986 New records for *Xylosandrus* and *Xyleborus* species (Coleoptera: Scolytidae). Proc. Ent. Soc. Wash. 88: 680-683.

4. Deyrup, M.A., and T.H. Atkinson. 1987. New distribution records of Scolytidae from Indiana and Florida. Great Lakes Ent. 20: 67-68.

5. Browne, F.G. 1961**.** The biology of Malayan Scolytidae and Platypodidae. Malayan Forest Records 22: 1-255.

6. Schedl, K.E. 1962. Scolytidae und Platypodidae Afrikas. II. Rev. Ent. Mozambique 5: 1-594.

7. Kovach, J., and C.S. Gorsuch. 1985. Survey of ambrosia beetle species infesting South Carolina peach orchards and a taxonomic key for the most common species. J. Agric. Ent. 2: 238-247.

Available Mapping Information:

1. Distribution map information for 1992. William Ree, Jr. ASIAN AMBROSIA BEETLE ACTIVEON PECANS IN EAST TEXAS UC-026. http://insects.tamu.edu/extension/bulletins/uc/uc-026.html. Last modified 1997.